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Lymph Node [18F]-fluorodeoxyglucose (FDG) Uptake as a Predictor of Chemotherapy Sensitivity in Malignant Lymphoma

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Purpose: To evaluate quantitative value of FDG uptake as a proliferating index and clinical significance as a response predictor, we performed this study. **Methods:** 42 patients (49, range 21-70) with malignant lymphoma were included. FDG-18 PET was performed before multiagent-chemotherapy. the proliferating activity was analyzed using the Ki-67 index. Attenuation-corrected whole body PET images were acquired 60 minutes after injection of 370-555 MBq FDG with a dedicated PET scanner. The visual analysis (grade 1 to grade 3: -1, lower; 0, equal; 1, slightly higher; 2, moderately higher; 3, intensely higher) and maximum SUV (max SUV) of nodal FDG uptake were evaluated, and compared with Ki-67 index. **Results:** Hodgkin's lymphomas were in 6 cases. According to the WHO classifications, the most common histologic subtype was diffuse large cell lymphoma among 36 Non-Hodgkin's lymphoma patients. According to the Ann Arbor staging system, 4 patients had stage I disease, 21 patients had stage II disease, 12 patients had stage III disease, and 5 patients had stage IV disease. All chemotherapy regimens contained doxorubicin. Nodal [18F]-FDG uptakes were showed linear correlation with Ki-67 expression levels (correlation coefficient r=0.667, p=0.0001, Figure). Total response rate to chemotherapy was 70.2%. The patients with higher nodal FDG uptakes (grade +2, +3) had higher response rates than with lower nodal FDG uptake (grade -1, 0, +1) (45.2% vs 25.0%, p=0.018). The nodal FDG uptakes were significantly related with the responses to doxorubicin-based multiagent chemotherapy. **Conclusion:** Nodal [18F]-FDG uptakes may be able to function as a predictor of chemotherapy sensitivity. Further studies for survival will be followed.

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Evaluation of Solitary Pulmonary Nodules using Integrated PET/CT: Improved Accuracy by FDG Uptake Pattern and Morphological Characteristics in CT for Attenuation Correction

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Purpose: FDG PET is useful for detecting malignant solitary pulmonary nodules (SPNs). However, it can show false positive results in benign lesions such as tuberculosis and organizing pneumonia. We investigated whether FDG uptake pattern and morphological characteristics in CT for attenuation correction (CT-AC) of SPNs could improve accuracy for evaluating SPNs over SUV in integrated PET/CT using FDG. **Methods:** Forty patients (M:F = 23:17, mean age 58.2 yrs) with non-calcified SPNs (diameter on CT=30 mm, no significant mediastinal node enlargement, no atelectasis) were included. All subjects underwent integrated PET/CT. On PET images, peak SUV (pSUV) of SPN was acquired, and FDG uptake patterns were categorized as even or heterogeneous increase. SPNs were classified as benign or malignant according to their morphological characteristics such as margin shape and air bronchogram using CT-AC images regardless of PET findings. **Results:** Thirty SPNs were confirmed as malignant, and 10 were benign by pathology. Of the 5 nodules with pSUV < 4.0, 4 nodules were benign. Nine of 14 nodules with pSUV between 4.0 and 7.0 were malignant, and 5 nodules were benign. Of the 21 nodules with pSUV of > 7.0, 20 nodules were malignant. When a nodule with evenly increased FDG uptake was considered as malignancy in indeterminate group with pSUV between 4.0 and 7.0, PET could diagnose 5 of 9 malignant nodules with one false positive nodule. In the remaining 8 nodules with heterogeneously increased FDG uptake, we could correctly differentiate malignancy from benignancy using CT-AC findings. Finally, this resulted in a sensitivity of 96.7% (29/30), specificity of 80% (8/10), and accuracy of 92.5% (37/40) to evaluate SPN. **Conclusion:** pSUV <4.0, 4.0-7.0 and >7.0 were suggestive of benign, indeterminate and malignant nodules, respectively. In indeterminate nodules, FDG uptake pattern and morphologic characteristics in CT-AC of SPN could improve the accuracy for evaluating SPNs in integrated PET/CT imaging.